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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/557,698	11/08/2006	Masato Sumikawa	925-330	7885
23117 7590 08/25/2009 NIXON & VANDERHYE, PC 901 NORTH GLEBE ROAD, 11TH FLOOR ARLINGTON, VA 22203				
EXAMINER				
D'ANIELLO, NICHOLAS P				
ART UNIT		PAPER NUMBER		
1793				
MAIL DATE		DELIVERY MODE		
08/25/2009		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/557,698

**Applicant(s)**

SUMIKAWA ET AL.

**Examiner**

Nicholas P. D'Aniello

**Art Unit**

1793

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 24 June 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) 12-14, 16-18 and 20-22 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11, 15 and 19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/S508)  
Paper No(s)/Mail Date 11-25-2005
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Election/Restrictions*

1. Applicant's election without traverse of Group I, claims 1-11, 15 and 19 in the reply filed on 6/24/2009 is acknowledged.

### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 15 and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by Kamiwoshi (JP 2002-170427 of record).

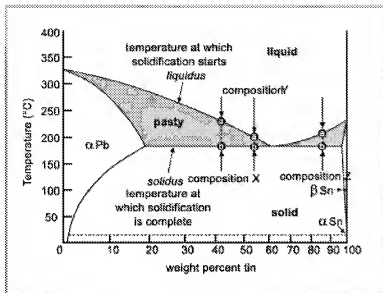
In regard to independent claim 1, Kamiwoshi teach a conductive ball (element 9 figure 2(a) - see abstract) comprising: a core 3 formed in a generally spherical shape and formed of a nonmetallic (plastic) material (paragraph [0011] of translation previously provided); and a coating layer coating a surface of the core and having at least a first metal layer 1 and a second metal layer 2, wherein, the first metal layer is made of a first alloy containing Sn and having non-eutectic composition (see paragraph [0022] of translation - no eutectic is disclosed), and the second metal layer 2 is made of a second alloy containing at least Ni or Cu (paragraph [0014]).

In regard to claims 15 and 19, the conductive ball is used in an electronic component (figure 1) which is used in electronic equipment (see paragraph [0001] of translation - the electronic mounting field).

4. Claims 1-5, 15 and 19 are rejected under 35 U.S.C. 102(b) as anticipated by Jiang et al. (US Pub 2003/0119299).

In regard to independent claim 1, Jiang et al. teach a conductive ball (figure 2B) comprising: a core 42 formed in a generally spherical shape and formed of a nonmetallic (polymeric) material (paragraph [0052]); and a coating layer coating a surface of the core and having at least a first metal layer (outer layer 44) and a second metal layer (adhesion promoting layer 44' or 44'' - see paragraph [0049] for adhesion promoting layer composition), wherein, the first metal layer is made of a first alloy containing tin and having non-eutectic composition (such as 95%Pd and 5% Sn), and the second metal layer (adhesion promoting layer) is made of a second alloy such as nickel (see paragraphs [0049 and 0052]).

In regard to claim 2, the first alloy has composition in which a liquidus temperature rises when a proportion of Sn in composition decreases (see lead - tin phase diagram below).



In regard to claim 3, the first alloy has composition closer to eutectic composition than to composition whose constituent forms an intermetallic compound (there is no tin-lead intermetallic).

In regard to claims 4 and 5, the first alloy has composition in which a liquidus temperature is 260°C or higher (see lead tin-phase diagram).

In regard to claims 15 and 19, the conductive ball is used in an electronic component (figure 1) which is used in a semiconductor assembly (i.e. electronic equipment see paragraphs [0003 and 0005]).

### ***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 6-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jiang et al. as applied to claim 1 above, and further in view of Pfarr et al. (US Pub 2005/0008525 an English equivalent of PCT/DE02/04525 which published as WO/051572 on 6/23/2003).

In regard to claims 6-11, Jiang et al. teaches that the preferred material for the metal layer 44 is a tin or silver alloy (paragraph [0052]) but does not disclose a specific alloy composition. However, Pfarr et al. teach a silver solder alloy for similar BGA devices which has tin and a silver content between 5.0 - 5.5 weight percent because such a composition avoids the formation of coarse tin dendrites when cooling and guarantees a smooth and homogenous surface of the solder (paragraph [0031]).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use a silver alloy with between 5.0 - 5.5 weight percent silver for the silver alloy layer in the conductive ball of Jiang et al. because such an alloy has multiple benefits in electronics manufacturing art as taught by Pfarr et al.

### ***Inquiries***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nicholas P. D'Aniello whose telephone number is (571)270-3635. The examiner can normally be reached on Monday through Thursday from 8am to 5pm (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jessica Ward can be reached on (571) 272-1223. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/N. P. D./  
Examiner, Art Unit 1793

/Jessica L. Ward/  
Supervisory Patent Examiner, Art Unit 1793